Atlantic Salmon Smolt Investigations, Restigouche River System, New Brunswick

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ATLANTIC SALMON SMOLT INVESTIGATIONS, RESTIGOUCHE RIVER SYSTEM, NEW BRUNSWICK

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ABSTRACT

Peppar, J.L. 1982. Atlantic salmon smolt investigations, Restigouche River system, New Brunswick. Can. MS Rep. Fish. Aquat. Sci. No. 1641. vii + 15 p.

Trapping operations for capturing and tagging Atlantic salmon wild smolts were conducted in the Restigouche River estuary, northern New Brunswick, 1973-76. As part of a program of salmon investigations to collect stock-assessment data over the period of the commercial-salmon-fishing closure, this study provided data on run timing and assessed, through tagging, the migration routes, timing and sites of potential exploitation of Restigouche River stock by distant-water fisheries.

Key words: Restigouche River, Atlantic salmon, wild smolts, run timing, migration routes, exploitation.

RÉSUMÉ

Peppar, J.L. 1982. Atlantic salmon smolt investigations, Restigouche River system, New Brunswick. Can. MS Rep. Fish. Aquat. Sci. No. 1641. vii + 15 p.

Des trappes ont été utilisées pour la capture et l'étiquettage de smolts sauvages de saumon atlantique dans l'estuaire de la rivière Restigouche, au nord du Nouveau-Brunswick, en 1973-76. Cette étude faisait partie d'un programme de recherche sur le saumon, conçu dans le but d'évaluer la condition du stock pendant la période de fermeture de la pêche commerciale. Elle a fourni en plus des données sur le temps de la remontée et a permis d'évaluer, grâce à l'étiquettage, les routes de la remonter, le temps et les endroits d'exploitation virtuelle du stock de la Restigouche dans les eaux lointaines.

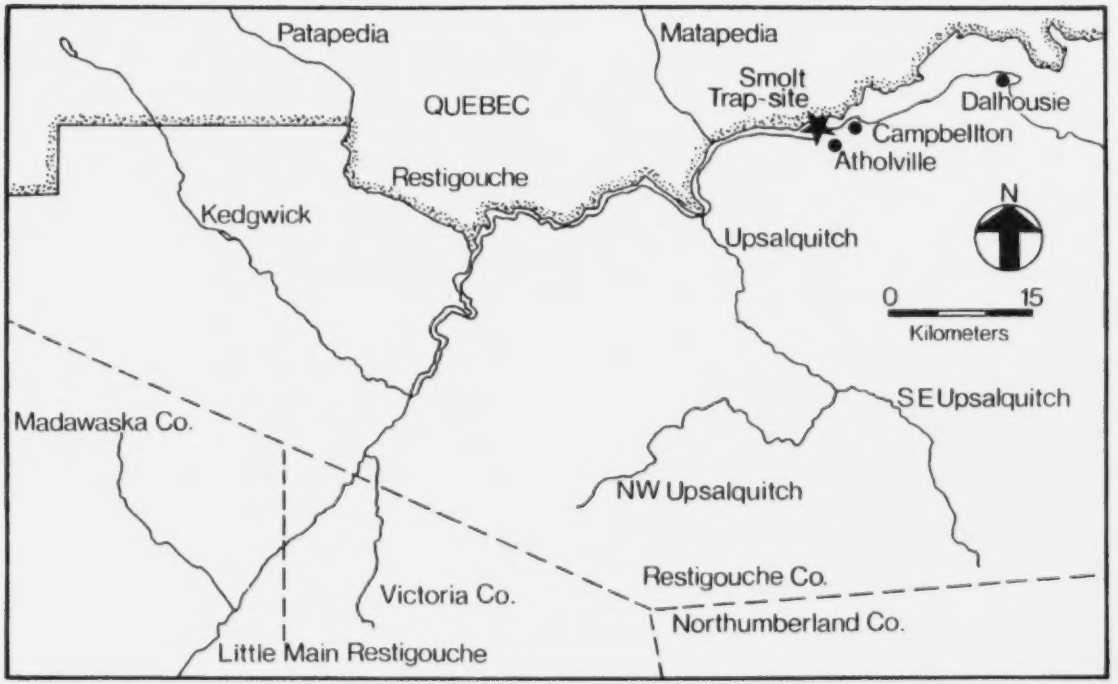

FIG. Map of Restigouche River system, New Brunswick.

INTRODUCTION

The Restigouche River forms the boundary between the provinces of Quebec and New Brunswick for about 80 km before it enters the sea at the head of Chaleur Bay. About 40 km of this length are tidal and comprise the Restigouche River estuary. Trapping operations for capturing and tagging Atlantic salmon wild smolts were conducted in the estuary, near Atholville, New Brunswick, each year over the period 1973-76 (Fig.).

The Resource Branch's biological investigations in the Restigouche River system were initiated in 1972, to provide data which could be utilized to assess the effects of a total closure of the commercial salmon fishery imposed that year, to predict the magnitude of future runs, and to provide advice on the resumption of commercial fishing. The following report summarizes results obtained from the wild-smolt trapping and tagging investigations. These studies were carried out to provide data on run-timing and to assess, through tagging, the migration routes, timing and sites of potential exploitation of Restigouche River stock by distant-water fisheries.

METHODS

In 1973 (the first year of trapping), the smolt trap was located in what was considered the main channel of the Restigouche River estuary (on the New Brunswick side), immediately upriver of the wharf at Old Church Point (about 4.4 km above Campbellton, New Brunswick). In 1974 and all subsequent years, the trap was set a few hundred metres downriver, at a point about 135 m offshore and immediately downriver of the wharf. The estuary at this point is over 1.6 km wide. An area of uniform flow was determined by observing drifting "floats", and it was decided that the channel could be covered, or at least controlled, by the length of trap leader employed.

The same trap was employed each year, a double-ended, modified, Miramichi box trap (see Dunfield 1974), constructed of 2.5-cm knotless nylon (black), with a 38-m leader of 7.5-cm polypropylene (orange) in 1973, and with a 54-m leader of the same material in subsequent years. In 1973, hard bottom conditions were encountered during the setting of the leader, and a partially floating leader was necessitated; only 5 m of the leader's length were supported by the standard method of brails and pickets. In 1974 and subsequent years, the entire trap and its associated leader was suspended by pickets. The trap was set each year during May, usually under heavy spring-freshet conditions.

Due to the necessity of working daylight hours, the trap was fished as early each morning as possible. The trap could be fished at anytime (i.e., was physically possible) except at low water. Difficulty was then experienced in resetting the net because of the height of the brails above the water.

At each fishing of the trap, smolts were removed with shallow scoop-nets and placed into "live-boxes" (partially floating plywood boxes, screened on each side) until ready for tagging. The boxes were then towed to two flat scows, used as the tagging platform. Smolts were then anaesthetized with MS222, in groups of 6-8 fish at a time, in a galvalized tub of estuarial water.

Modified Carlin tags (0.5 cm x 1.4 cm) with monofilament leaders were applied with double, 19-gauge, tagging needles. Once the tag was secured, the smolt was placed into a second live-box and allowed to recover fully from the anaesthetic. Subsequent releases of tagged smolts were made approximately 180 m below and to the outside of the trap.

RESULTS AND DISCUSSION

WATER TEMPERATURE RECORDED AT TRAP

Mean maximum and minimum water temperatures recorded at the trap during the 1973, 1974 and 1976 seasons were as follows:

Mean min. temp(°C)			Mean max. temp(°C)		
1973	1974	1976	1973	1974	1976
Semi-monthly period					
16-31 May					
6.1 (7)[1]	3.3 (5)	10.0 (2)	7.6 (7)	6.6 (5)	13.5 (2)
1-15 June					
10.6 (15)	8.0 (14)	11.6 (12)	11.9 (15)	9.7 (14)	13.8 (12)
15-30 June					
13.7 (7)	- (0)	14.5 (2)	16.3 (7)	- (0)	16.0 (2)

[1]Numbers of days over which means are calculated are shown in ().

SMOLT CATCHES AND RUN TIMINGS

Numbers of smolts trapped and counted ranged from 937 in 1973, at the initial trap location, and from 2,175 in 1974 to 4,125 in 1976 at the subsequent trap location - a 4-year mean of 2,701 (Table 1).

With the exception of 1976, the largest numbers of smolts captured each

year were taken during the first half of June; during the years 1973-75, 54%-97% of the sample catch was recorded during this period (Table 2). In 1976, 60% of the smolts were captured during the fishing days in May, in contrast to the 2%-35% recorded during the same period in 1973-75.

In general, the smolt run tended to peak in early June, and drop off dramatically by mid-June. In 1976, this peak was recorded earlier and the run dropped off earlier, in both instances by about one week. This appears to relate well to the water temperatures shown in the previous text table. A mean minimum temperature of 10°C was recorded in late May in 1976 but not until early June in 1973 and mid-June in 1974 (inadequate recordings of temperatures over the 1975 season prevent further comparisons).

TAGGING AND RECAPTURE

The numbers of smolts tagged and released each year ranged from 769 in 1973 to 3,286 in 1976 - a 4-year mean of 2,076 (Table 3). Average lengths of those smolts tagged and measured were highest in 1973, at 14.8 cm, and then remained rather constant for the subsequent years of tagging, at about 14.2 cm (Table 4).

Up to the end of 1981, 56 adult salmon recaptures were recorded from the 8,302 smolts tagged and released over the 1973-76 period (0.7% recapture rate). These returns consisted of 1-sea-winter salmon (43%), 2-sea-winter salmon (45%) and 3-sea-winter-salmon (12%) (Table 5) (see Allan and Ritter 1977, for terminology description). Returns from the 1973 and 1974 years of tagging provided the highest recapture rates, 1.8% and 1.2%, respectively (Table 5). Recaptures were recorded from five major areas, with a percentage return as follows: Greenland (30%), Labrador (16%) Newfoundland (25%), Nova Scotia (2%) and home waters - Chaleur Bay, Restigouche River (27%) (Table 6).

Timing of the ascending adult salmon run to the Restigouche River is typically early; i.e., the majority of fish enter the river between May and September. This has been well-documented by adult-salmon trapping operations conducted at the head of the estuary each year since 1972. Data on the ages of these salmon at migration have been presented (Peppar and Pickard 1975; Pickard and Peppar 1979). It is known that large salmon (2- and 3-sea-winter fish) arrive in the Restigouche River estuary in May, with the peak of the run occurring during the period mid-June to mid-July. Grilse (1-sea-winter fish) arrive later, with the peak of the run occurring in July. Movement of salmon into the estuary after the end of July is minimal, especially during August. A fall run is known to occur in September, or later; however, it is insignificant compared to the strong early run.

Restigouche salmon were caught in almost all ICNAF divisions off West Greenland (Table 7). These were taken between August and October, primarily as 1-sea-winter fish (two fish as 2-sea-winter salmon). West Greenland provided the largest number of 1-sea-winter recaptures (63%) (Table 6). It is obvious that these fish (1-sea-winter) were not destined to return to the Restigouche as grilse, after one winter at sea. Turner (1975*b*) and Saunders (1969) found the same situation for Miramichi River salmon.

In Labrador, Restigouche salmon were caught in ICNAF Division 2J over the June-August period (Table 7). These fish were taken as 2-sea-winter salmon (one exception, a 3-sea-winter salmon).

Recaptures of Restigouche salmon were recorded in ICNAF divisions 3K and 3L off the east coast of Newfoundland and in 3Ps and 3Pn off the south coast (Table 7). These were taken between May and July, as 1- and 2-sea-winter fish. Newfoundland and Labrador provided the largest number of 2-sea-winter salmon recaptures (32% from each area), and insular Newfoundland alone provided the second-largest number of 1-sea-winter recaptures (25%). The west coast of Newfoundland yielded no recaptures of Restigouche salmon tagged as smolts.

The timing of the Newfoundland recaptures depended on the specific area of recapture or the subsequent age at recapture. Two-sea-winter salmon were taken off the east coast from early June to late July; whereas, off the south coast, the recaptures were recorded earlier, between late May and late June (Table 7). The late June to early July period accounted for three of the five 2-sea-winter recaptures off the east coast. In contrast, two of three recaptures taken off the south coast were taken during late-May. All 1-sea-winter recaptures were recorded from late June to late July, thus showing a timing of recapture similar to the 2-sea-winter recaptures off the east coast and considerably later than the timing of the 2-sea-winter recaptures off the south coast.

The timing of the Restigouche salmon recaptures off Newfoundland would indicate that some fish were in a position to return to their native river during the early-run period of the same year. This would be probable for the 2-sea-winter fish captured off the south coast of Newfoundland. (A 2-sea-winter salmon tagged 5/6/76 by the Fisheries and Marine Service, Newfoundland, off Isle aux Morts, Newfoundland, was angled in the Little Main Restigouche River on 28/7/76.) Those off the east coast, however, would probably not return to the river during the early-run period but could possibly contribute to the late-run. Timing of 1-sea-winter recaptures indicates a later return as well, or, that they would have remained at sea for an additional winter or more, to return eventually as 2- or

3-sea-winter fish (Turner 1975a found a similar situation for Miramichi River salmon).

The timing of Restigouche recaptures off Labrador indicates a return similar to the 2-sea-winter salmon captured off the northeast coast of Newfoundland. The fish may arrive in the Restigouche during the fall-run period or remain at sea for an additional winter.

Recaptures of Restigouche salmon were recorded in the home waters (Chaleur Bay and Restigouche River) between June and August, as 1-, 2- and 3-sea-winter fish (one 3-sea-winter salmon recorded as a "kelt" in April) (Table 7). The timing of these recaptures falls within the early-run period, typical for the majority of fish entering the Restigouche River system. The home waters provided the largest number of 3-sea-winter salmon recaptures (86%).

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TABLE 1. Daily catches and cumulative totals of wild smolts caught in Restigouche River smolt-sampling trap, Atholville, New Brunswick, 1973-76. (Dash indicates trap not in water; N/F indicates trap not fished.)

Month	Day	Daily catch (No.)				Cumulative Totals (No.)			
		1973	1974	1975	1976	1973	1974	1975	1976
May	22	-	-	26	-	-	-	26	-
	23	-	-	88	-	-	-	114	-
	24	-	-	70	-	-	-	184	-
	25	22	-	67	-	22	-	251	-
	26	35	-	37	589	57	-	288	589
	27	40	1	238	961	97	1	526	1,550
	28	10	6	N/F	115	107	7	526	1,665
	29	49	13	202	37	156	20	728	1,702
	30	85	7	96	462	241	27	824	2,164
	31	91	18	127	302	332	45	951	2,466
June	1	14	32	N/F	69	346	77	951	2,535
	2	51	-	128	118	397	77	1,079	2,653
	3	75	184	586	208	472	261	1,665	2,861
	4	89	50	412	1,019	561	311	2,077	3,880
	5	63	205	256	113	624	516	2,333	3,993
	6	88	188	N/F	47	712	704	2,333	4,040
	7	18	169	N/F	17	730	873	2,333	4,057
	8	26	376	30	12	756	1,249	2,363	4,069
	9	12	412	-	5	768	1,661	2,363	4,074
	10	6	263	42	32	774	1,924	2,405	4,106
	11	23	46	300	12	797	1,970	2,705	4,118
	12	8	51	562	N/F	805	2,021	3,267	4,118
	13	12	50	5	N/F	817	2,071	3,272	4,118
	14	5	39	N/F	0	822	2,110	3,272	4,118
	15	14	37	115	0	836	2,147	3,387	4,118
	16	6	-	21	4	842	2,147	3,408	4,122
	17	8	N/F	17	3	850	2,147	3,425	4,125
	18	47	N/F	112	-	897	2,147	3,537	-
	19	28	12	N/F	-	925	2,159	3,537	-
	20	5	15	31	-	930	2,174	3,568	-
	21	0	1	-	-	930	2,175	-	-
	22	7	-	-	-	937	-	-	-

TABLE 2. Wild smolt catches by semi-monthly periods, Restigouche smolt-sampling trap, Atholville, New Brunswick, 1973-76.

Semi-monthly period	No. fishing days				Catch/period				Percent of total catch				Catch/fishing day			
	/73	/74	/75	/76	/73	/74	/75	/76	/73	/74	/75	/76	/73	/74	/75	/76
May 16-31	7	5	9	6	332	45	951	2,466	35.4	2.1	26.7	59.8	47.4	9.0	105.7	411.0
Jun 1-15	15	14	10	13	504	2,102	2,436	1,652	53.8	96.6	68.3	40.1	33.6	150.1	243.6	127.1
Jun 16-30	7	3	4	2	101	28	181	7	10.8	1.3	5.1	0.2	14.4	9.3	45.3	3.5
Totals	29	22	23	21	937	2,175	3,568	4,125								

TABLE 3. Numbers of wild smolts tagged and released, Restigouche smolt-sampling trap, Atholville, New Brunswick, 1973-76.

Semi-monthly period	Numbers of smolts				
	1973	1974	1975	1976	Mean
May 16-31	286	34	799	1,816	734
Jun 1-15	400	1,076	2,162	1,467	1,276
Jun 16-30	83	19	157	3	66
Totals	769	1,129	3,118	3,286	2,076

TABLE 4. Average fork lengths of wild smolts tagged and measured from Restigouche smolt-sampling trap, Atholville, New Brunswick, 1973-76.

Semi-monthly period	Average fork length (cm)			
	1973	1974	1975	1976
May 16-31	14.1(282)[1]	14.2(34)	14.1(643)	14.3(655)
Jun 1-15	15.1(418)	14.1(934)	14.0(2,171)	14.0(500)
Jun 16-30	15.8(85)	15.3(19)	14.3(157)	- (0)
Overall	14.8(785)	14.2(987)	14.0(2,971)	14.2(1,155)

[1]Sample sizes shown in ().

TABLE 5. Adult salmon recaptures, by age at recapture, as numbers and percentages () of smolt release years, from Restigouche smolt tagging, Atholville, New Brunswick, 1973-76.

Release year	No. smolt tagged and released	1-sea-winter	2-sea-winter	3-sea-winter	Total
1973	769	9(1.2)	4(0.5)	1(0.1)	14(1.8)
1974	1,129	7(0.6)	5(0.4)	1(0.1)	13(1.2)
1975	3,118	5(0.2)	8(0.3)	5(0.2)	18(0.6)
1976	3,286	3(0.1)	8(0.2)	0(0.0)	11(0.3)
Totals	8,302	24(0.3)	25(0.3)	7(0.1)	56(0.7)

[1]Totals include all recoveries to the end of December, 1981.

TABLE 6. Adult salmon recaptures, by area and age at recapture, from Restigouche smolt tagging, Atholville, New Brunswick, 1973-76.

Recapture location	Recaptures[1]							
	1-sea-winter		2-sea-winter		3-sea-winter		Total	
	No.	%	No.	%	No.	%	No.	%
Greenland	15	63	2	8	0	0	17	30
Labrador	0	0	8	32	1	14	9	16
Newfoundland	6	25	8	32	0	0	14	25
Nova Scotia	0	0	1	4	0	0	1	2
Home Waters	3	13	6	24	6	86	15	27
Totals	24	100	25	100	7	100	56	100

[1]Totals include all recoveries to the end of December, 1981.

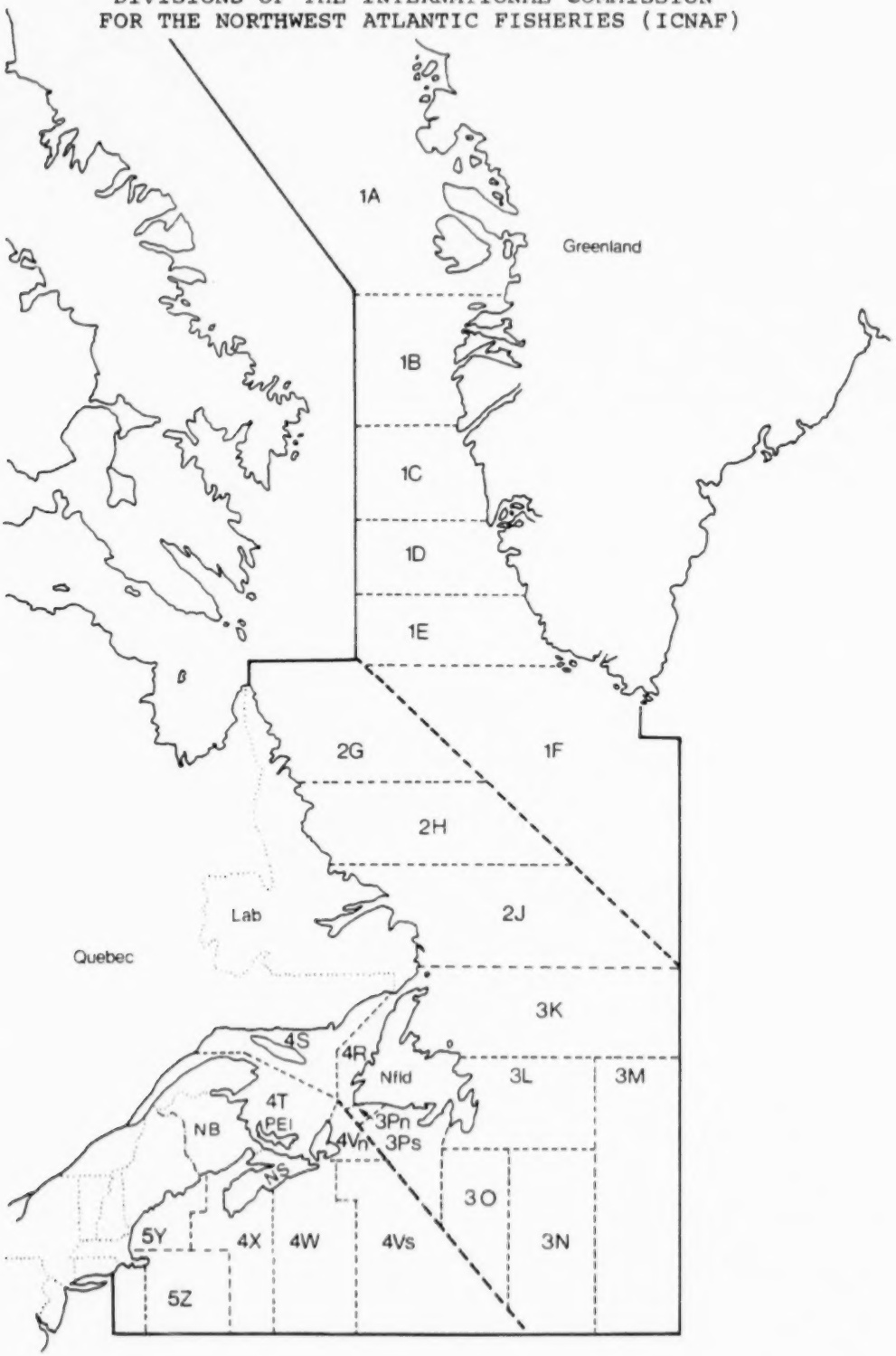
TABLE 7. Adult salmon tag recaptures to the end of 1981, from Restigouche smolt tagging, Atholville, New Brunswick, 1973-76.

Tag no.	Release year	Recapture date	Recapture location: Country, province, etc.	Statistical division: ICNAF division (App. A)	Statistical division: Nfld. fisheries statistical dist. (App. B)
			Greenland		
Q45077	1973	/74	Holsteinborg	1B	-
Q45135	1973	4/10/74	West Greenland	1?	-
Q45167	1973	/74	Holsteinborg	1B	-
Q45272	1973	/74	West Greenland	1?	-
Q45364	1973	13/09/74	Julianehab	1F	-
Q45440	1973	23/08/74	Sukkertoppen	1C	-
Q45553	1973	/74	Hellefiske Island	1D	-
Q50694	1974	/75	West Greenland	1?	-
Q50805	1974	/75	West Greenland	1?	-
Q50889	1974	/75	West Greenland	1?	-
Q50909	1974	15/09/75	West Greenland	1C	-
Q50587	1974	8/10/76	Sydproven	1F	-
Q51510	1975	13/09/76	Diskofjord	1A	-
Q46278	1975	14/08/76	Kangamiut	1C	-
H41027	1976	/77	West Greenland	1?	-
Q48515	1976	1/09/77	West Greenland	1C	-
Q48343	1976	/78	West Greenland	1B	-
			Newfoundland (Labrador)		
Q45534	1973	20/06/75	Salmon Gulch	2J	O 51
Q45387	1973	15/07/76	Labrador	?	O ?
Q50258	1974	17/07/76	Labrador	?	O ?
Q50668	1974	1/07/76	Ship Harbour	2J	O 51
Q46724	1975	24/08/77	Fox Harbour	2J	O 51
Q48090	1976	4/07/78	Battle Harbour	2J	O 51
Q48105	1976	3/07/78	Fishing Ships Harbour	2J	O 51
Q49196	1976	6/07/78	Snug Harbour	2J	O 51
Q49166	1976	13/07/78	Snug Harbour	2J	O 51
			Newfoundland (island)		
Q45200	1973	1/07/74	Blow Me Down, Placentia Bay	3Ps	H 32
Q45465	1973	18/07/74LD	Bull's Island, Trinity Bay	3L	D 17
Q45379	1973	6/07/75	Englee	3K	A 04
Q50147	1974	22/06/75	Bay de Verde	3L	E 20
Q50118	1974	21/06/76	St. Anthony Bight	3K	A 02
Q46016	1975	5/07/76	Garnish	3Ps	I 33
Q47589	1975	5/07/76	Witless Bay	3L	F 25
Q46438	1975	28/05/77	Western Head, Bay View	3Ps	H 32
Q46883	1975	20/07/77	Job's Cove, Conception Bay	3L	E 20
Q51140	1975	30/05/77	Port aux Basques	3Pn	J 39
Q51541	1975	13/07/77	La Scie, White Bay	3K	A 05
Q51978	1975	16/06/77	Dodding Harbour, Burin	3Ps	H 32
Q51403	1975	9/06/77	Bonavista	3L	D 14
Q49838	1976	28/06/77	Fleur de Lys, White Bay	3K	A 05
			Nova Scotia		
Q45302	1973	1/07/75	Port George, Annapolis County	4X	-
			Home Waters, Restigouche		
Q45325	1973	29/07/75	Upsalquitch River	4T	-
Q50341	1974	19/07/75	Dalhousie, Bon Ami Rocks (trap)	4T	-
Q50440	1974	26/08/75	Patapedia River (Elder Pool)	4T	-
Q50710	1974	17/07/76	Restigouche River (Morrissey Rock)	4T	-
Q50253	1974	20/06/77	Kedgwick River	4T	-
Q46301	1975	7/07/76	Dalhousie, Bon Ami Rocks (trap)	4T	-
Q46407	1975	14/07/77	Restigouche River	4T	-
Q51092	1975	2/08/78	Matapedia River	4T	-

Tag no.	Release year	Recapture date	Recapture location: Country, province, etc.	Recapture location: Statistical division: ICNAF division (App. A)	Recapture location: Statistical division: Nfld. fisheries statistical dist. (App. B)
Q51126	1975	26/06/78	Matapedia River	4T	-
Q51709	1975	15/06/78	Matapedia River	4T	-
Q50995	1975	28/06/78	Dalhousie, Bon Ami Rocks (trap)	4T	-
Q51250	1975	18/04/78	Upsalquitch River	4T	-
Q48599	1976	4/07/78	Dalhousie, Bon Ami Rocks (trap)	4T	-
Q49218	1976	31/08/78	Matapedia River	4T	-
H40063	1976	27/06/78	Matapedia River	4T	-

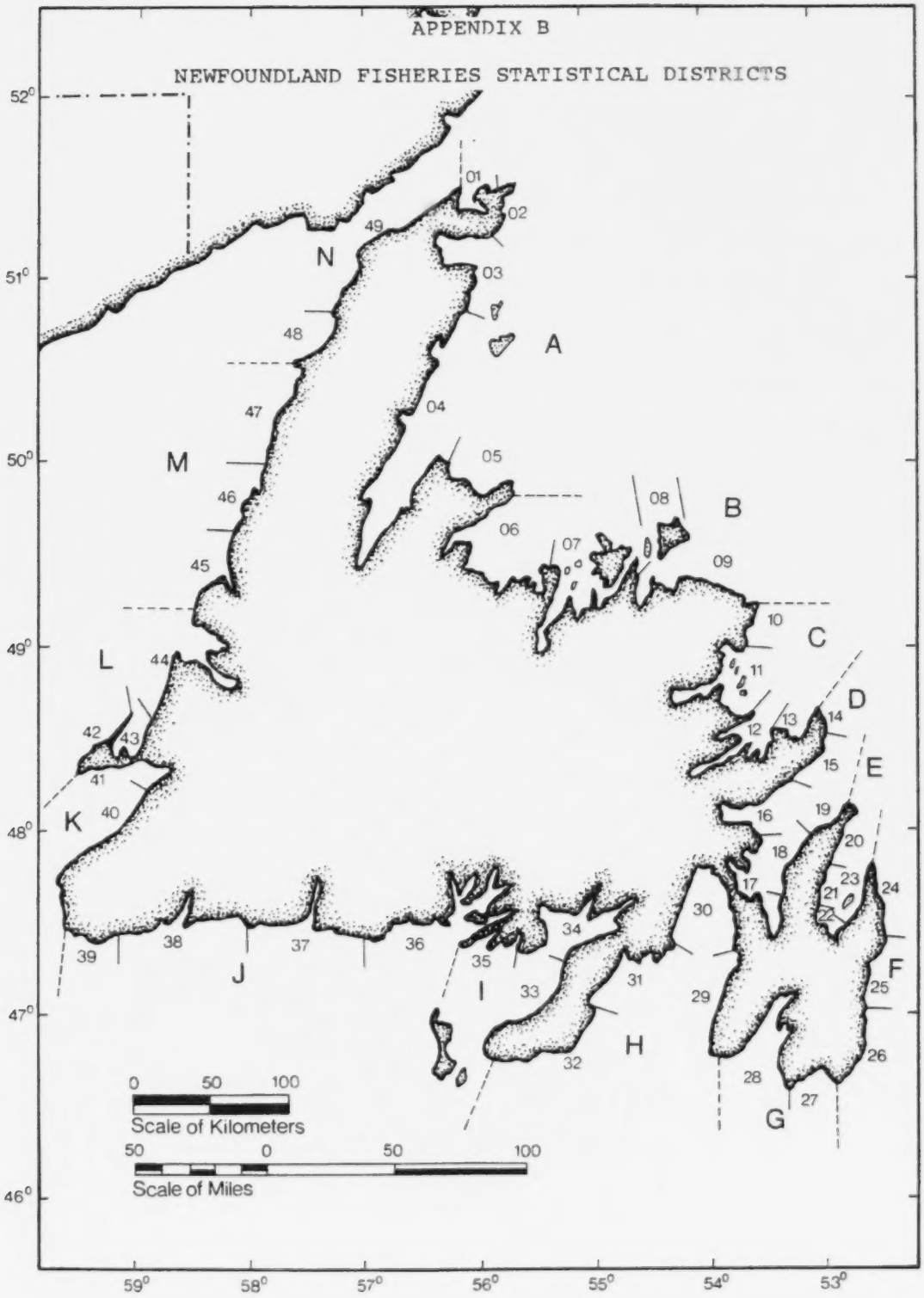
APPENDIX A

DIVISIONS OF THE INTERNATIONAL COMMISSION
FOR THE NORTHWEST ATLANTIC FISHERIES (ICNAF)



APPENDIX B

NEWFOUNDLAND FISHERIES STATISTICAL DISTRICTS



REFERENCES

Allan, I.R.H. and J.A. Ritter. 1977. Salmonid terminology. J. Cons. int. Explor. Mer, 37(3):293-299.

Dunfield, R.W. 1974. Types of commercial salmon-fishing gear in the Maritime Provinces - 1971. Resource Development Branch, Maritimes Region, Information Publication No. MAR/N-74-1. 43 p.

Peppar, J.L. and P.R. Pickard. 1975. Ages at migration of Atlantic salmon in the Restigouche River. Resource Development Branch, Maritimes Region, Data Record Series No. MAR/D-75-8. 7 p.

Pickard, P.R. and J.L. Peppar. 1979. Ages at migration of Atlantic salmon in the Restigouche River, 1976-78. Can. Data Rep. Fish. Aquat. Sci. No. 165. v + 5 p.

Saunders, R.L. 1969. Contributions of salmon from the Northwest Miramichi River, New Brunswick, to various fisheries. J. Fish. Res. Bd. Canada, 26:268-278.

Turner, G.E. 1975*a*. Exploitation of Miramichi Atlantic salmon based on smolts tagged in 1968, 1969 and 1970. Resource Development Branch, Maritimes Region, Technical Report Series No. MAR/T-75-3. v + 11 p.

Turner, G.E. 1975*b*. Migration route and timing of Miramichi River salmon (*Salmo salar*) as indicated from recaptures of tagged smolts and adults. Resource Development Branch, Maritimes Region, Technical Report Series No. MAR/T-75-7. v + 11 p.